

Florida Space Grant Consortium  
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Consortium URL: [www.floridaspacegrant.org](http://www.floridaspacegrant.org)  
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## **PROGRAM DESCRIPTION**

The National Space Grant College and Fellowship Program consists of 52 state-based, university-led Space Grant Consortia in each of the 50 states plus the District of Columbia and the Commonwealth of Puerto Rico. Annually, each consortium receives funds to develop and implement student fellowships and scholarships programs; interdisciplinary space-related research infrastructure, education, and public service programs; and cooperative initiatives with industry, research laboratories, and state, local, and other governments. Space Grant operates at the intersection of NASA's interest as implemented by alignment with the Mission Directorates and the state's interests. Although it is primarily a higher education program, Space Grant programs encompass the entire length of the education pipeline, including elementary/secondary and informal education. The Florida Space Grant Consortium is a Designated Consortium funded at a level of \$575,000 for fiscal year 2012.

## **PROGRAM GOALS**

### **FELLOWSHIPS & SCHOLARSHIPS**

1. Enable students to pursue careers in the space program – whether through graduate, undergraduate, or Community College technical training.

**SMART Objective** – On an annual basis, at least 20 undergraduate and/or technical training awards and 3 graduate fellowships will be competitively awarded to students who wish to pursue space/aerospace/aeronautics training. At least six of these awards will be offered to minority candidates and at least 8 to female students. At least 70% of awardees will continue to the next step in their chosen STEM disciplines (academia/NASA/industry).

**This goal positively impacts NASA Objectives: 5.1 and 6.1**

2. Facilitate Space-Related Research Symposia for students, NASA engineers and FSGC awardees

**SMART Objective** – By March 2014, facilitate at least two Space-Related Research Symposia within the State of Florida that specifically target graduate student participation involving at least 12 students and 10 mentors.

**This goal positively impacts NASA Objectives: 5.1 and 6.1**

## RESEARCH INFRASTRUCTURE

1. Support NASA related interdisciplinary research projects emphasizing work-force development with undergraduate and graduate students.
  - a. **SMART Objective** – On an annual basis, at least 12 research projects will be competitively awarded. At least three of these research project awards will be awarded to a minority serving institution and/or include minority participation. At least 12 undergraduate or graduate students will be supported by the projects, including at least 5 women and 4 under-represented minorities

**This goal positively impacts NASA Objectives: 5.1, and 6.1**

2. Foster collaboration among NASA engineers, Florida university faculty and industry partners.
  - a. **SMART Objective** – By March 2014, facilitate at least two Space-Related Research Symposia within the State of Florida that specifically target NASA engineers, Florida university faculty and industry partners.

**This goal positively impacts NASA Objectives: 5.1. and 6.1.**

## HIGHER EDUCATION

1. Provide undergraduate students with opportunities for interdisciplinary hands-on experiences in team-based student launch activities and student pay-load development programs to better understand STEM concepts as they relate to space exploration.
  - a. **SMART Objective** – On an annual basis, involve at least 100 students, representing a minimum of five Florida-based higher education institutions, including at least one minority serving institution, in collaborative space-based interactive learning experiences.

**This goal positively impacts NASA Objectives: 5.1, 6.1, and 6.2.**

## PRE-COLLEGE EDUCATION

Contribute space-related resources and training to help increase the number of K-12 teachers who:

1. Use space-related curricula resources to motivate more students to pursue advanced math and science courses.
  - a. **SMART Objective** – On an annual basis, conduct and/or facilitate space-related pre-service and in-service teacher training opportunities focused on space-related math and/or science curricula. A minimum of 50 Florida teachers per year will attend this training.

**This goal positively impacts NASA Objectives: 5.1, 6.1, and 6.2**

## INFORMAL EDUCATION (GENERAL PUBLIC)

Contribute space-related resources to help increase the number of citizens who are aware of:

1. How the application of math and science enable or enhance common activities, NASA's contributions to our standard of living (beyond Velcro®), and NASA's mission.
  - a. **SMART Objective** – On an annual basis, collaborate with Florida museums and/or science centers to facilitate/conduct engaging space-related learning events held in public venues. A minimum of two events per year will be held. At least 200 members of the public will attend one or more of these events per year.

**This goal positively impacts NASA Education Objective: 6.4**

Progress FSGC is making in achieving our program goals.

- Percentage of students whom have taken their next step and have been successfully tracked though their next step vs last year of SG support.
  - 84% for 2006
  - 70% for 2007
  - 97% for 2008
  - 89% for 2009
  - 92% for 2010
  - 100% for 2011
  - n/a for 2012 – all participants sill enrolled
  - 88% for 2006-2012
- 85% of students significantly supported by went onto next steps in STEM disciplines

## PROGRAM/PROJECT BENEFIT TO OUTCOME (1,2, & 3)

*Provide concise, meaningful highlights or anecdotes (no more than three) that are directly related to work completed in 2012, highlighting student and/or project accomplishments. Specify alignment to an Outcome.*

It impacted my education and life because it made me realize how important STEM is and how we need to instill our educational insight into young girls. (Alecia Popovich - on 01/21/13, 2011 Space Grant Research Award, 2013 Space Grant Higher Education Program, Florida Gulf Coast Biomechanics Lab - Research Assistant)

Participating in this program has allowed me to interact as a role model for teenage girls interested in space engineer. My knowledge for this area of study has expanded. This has been a wonderful experience and I plan to continue participating. (Dailiana Poveda - on 04/24/12, 2011 Space Grant Research Award, 2013 Space Grant Higher Education Program)

My research in space mechanisms has improved many of my capabilities in FEA analysis, vibrational analysis and team-building. I am currently still a graduate researcher at UF. As part of my research, I have led a group of undergraduate students in developing a deployable boom mechanism for instrumentation on a small satellite. This group is working in collaboration with the AFRL, NASA, KTH (Sweden), and IAUPR (Puerto Rico) to build and launch a small satellite in 2013. (Paul Moore - on 04/05/12, 2010 Space Grant Research Award, 2013 Space Grant Research Award, University of Florida - graduate researcher)

## **PROGRAM ACCOMPLISHMENTS**

**Outcome 1:** *Contribute to the development of the STEM workforce in disciplines needed to achieve NASA's strategic goals:*

- 56 students took next step in FY12 (SG participation supported from FY06-FY12 funds)
  - 20 are pursuing advanced degrees in STEM disciplines
  - 5 accepted STEM positions at NASA contractors
  - 2 accepted positions at NASA
  - 8 accepted STEM positions in industry
  - 8 accepted STEM positions in academia
  - 13 went on to positions in non-STEM disciplines
- 66 students significantly supported from FY12 funds
  - 37 in Fellowship & Scholarships
  - 29 in Higher Education/Research programs
- 209 students from 9 universities, including 1 Hispanic serving institution and 1 HBCU, are participating in Higher Education Projects

### **Fellowships and Scholarships**

Among the 37 students significantly supported from FY12 fellowship and scholarships are:

- 1 industry interns
- 7 graduate fellows
- 29 scholars

Through our fellowship program, graduate students, enrolled in a Ph.D or Master's program, are provided a year-long fellowship. Under this program, we funded 7 graduate fellows (2 women). – met our fellowship goal for gender equity but did not meet our under-representative goals.

Through the scholarship program, FSGC funded scholars in industry and Florida universities. 1 of them interned at Masten Space Systems, while 23 students were

provided scholarships at our affiliate universities. In addition, 6 students interned at NASA centers. Among the 30 scholars and interns, 26 students were under-represented minorities and 14 were women. This was well above our goals for both under-represented minorities and gender.

***SMART Objective*** – On an annual basis, at least 20 undergraduate and/or technical training awards and 3 graduate fellowships will be competitively awarded to students who wish to pursue space/aerospace/aeronautics training. At least six of these awards will be offered to minority candidates and at least 8 to female students. At least 70% of awardees will continue to the next step in their chosen STEM disciplines (academia/NASA/industry).

*FSGC has awarded 7 graduate fellowships, and 30 scholarships. A total of 26 students were under-represented minorities and 16 were women. According to the National Center for Education statistics webpage*

*([http://nces.ed.gov/programs/digest/d11/tables/dt11\\_239.asp](http://nces.ed.gov/programs/digest/d11/tables/dt11_239.asp)), 42.3% of the students enrolled in degree granting Florida institutions in 2011 are under-represented minorities. For FSGC, 70% of the students supported as scholars or fellows are under-represented minorities. If one takes into account all the students directly supported by FSGC through fellowships, scholarships, research projects and higher education, then the percentage of under-represented minorities is 54% which is above the Florida total student minority distribution. Among the direct funded students, 51.5% are women*

### **Higher Education**

Students from are working on senior design projects such as the design of a sub-orbital Hybrid Rocket, balloon payload, cubesat, Moon buggy, and NASA University Student Launch Initiative (USLI). Students from universities and community colleges are working on student collaborative projects like the nano-satellite design competition, hybrid-rocket design competition and balloon launches. Details of our higher education programs are as follows:

Senior Design and Competitions; FSGC has supported 10 senior design projects involving 52 students at the Florida State University, University of South Florida, Florida International University, University of Central Florida and Embry-Riddle Aeronautical University. Some of the projects supported included Multi-Element Free Space Optical Modules for Mobile Communications and Smart Lighting, Remote Access Arm, Aerial Reconnaissance Drone, Micro Air Vehicle (MAV) Autonomous Wing Control, and Ozone Analysis.

Hybrid Rocket Competition: 62 students in 7 teams from 5 universities (University of Florida, University of Miami, Florida Institute of Technology, University of Central Florida, and Embry-Riddle Aeronautical University) took part in this competition. The objective of the competition is to build and launch a hybrid powered rocket. There are two categories in the competition. The first category consists of launching a hybrid rocket to the maximum altitude. The second category challenges the teams to fly their rocket closest to 2000 feet in altitude. The launch day is April 13, 2013 at Bunnell Florida. This program is also supported by the North East Florid Rocket Club. This

competition is a stepping stone for students to participate in the University Student Launch Initiative competition. This project is sponsored by FSGC and the Florida Space Institute.

Fourth Annual NASA Lunabotics Competition: This is a University-level competition designed to engage and retain students in science, technology, engineering and mathematics (STEM). The challenge is for students to design and build an excavator, called a Lunabot, that can mine and deposit a minimum of 10 kilograms of lunar simulant within 10 minutes. The complexities of the challenge include the abrasive characteristics of the BP-1, the weight and size limitations of the Lunabot, and the ability to telerobotically or autonomously control the Lunabot from a remote mission control center. The competition will be held at the Kennedy Space Center Visitor Complex from May 20-24, 2013. There are 32 US teams participating in the competition and 3 are from Florida. FSGC is partially supporting 2 of the Florida teams. The teams represent Florida Institute of Technology and Embry-Riddle Aeronautical University. 31 students are participating from these 2 universities

NASA/RASC-AL ROBO-OPS Student Competition: The ROBO-OPS Project is a joint senior design project between Florida A & M University and Florida State University. 6 students majoring in Mechanical and Electrical Engineering are collaborating on a robot design project. In June 2013, NASA will be hosting the annual RASC-AL Exploration ROBO-OPS Competition. The goal of this project is to design and build an innovative robot to have accepted to enter in this competition. This team's last year's entry in NASA's Lunabotics Competition had provided them an invaluable base of experience for this year's competition. This year's design is a hexapedal walking platform. This method of locomotion will eliminate the difficulties navigating obstacles experienced by previous competing teams.

USLI: The NASA University Student Launch Initiative, or USLI, is a competition that challenges university-level students to design, build and launch a reusable rocket with a scientific or engineering payload to one mile above ground level, or AGL. The project engages students in scientific research and real-world engineering processes with NASA engineers. 36 US university teams are participating in the competition and 4 teams are from Florida. FSGC is supporting the team from the University of Central Florida. Six seniors representing The University of Central Florida (UCF) have submitted a project proposal to NASA to participate in the 2012-2013 USLI competition. The UCF team has developed a comprehensive project plan detailing all aspects of the research, payload, design, partnerships, and community involvement. The primary objective is to become engaged with the scientific process to design a rocket that will meet or exceed competition requirements. The launch date is on April 20, 2013.

FUNSAT Competition: The FUNSAT (Florida University SATellite) is a pico-satellite with a maximum mass of 1 Kg and the size of 10 x 10 x 10 cm<sup>3</sup>. The main objectives of this competition are promotion of an interdisciplinary project for systems engineering, supporting a test-bed for advanced technologies such as MEMS, and promoting advanced study and career development for Florida students in the field of aerospace. The

competition will include the design, fabrication, and a possible launch into space for the winning design. In the conceptual design (first round), competitors will be provided with technical support by FSGC, NASA and space industries. The finalists will be partially supported for their detailed design and building of their FUNSAT, which are all material costs as well as a technical workshop at the Kennedy Space Center. 11 students from 2 teams from the University of Florida and the University of Central Florida took part in the competition. Students from the 2 finalist teams will present their work at a conference on May 3, 2013

Other Collaborative student projects: In addition to the support provided for senior design projects and competitions, FSGC has also supported 2 projects at the University of Central Florida and Florida International University to help the students in those universities start new science and engineering clubs. One project was a balloon payload and launch by Astronomy students at the University of Central Florida and the other was a workshop for students at the Florida International University for students interested in rocketry. FIU did not have a rocketry club and we hope that these students now participate in the NASA competitions. A total of 36 students participated in these 2 projects

Undergraduate Program Development: Through a grant to Embry-Riddle Aeronautical University, Dr. Lance Erickson has been developing a new course for undergraduate students focused on commercial space operations. This is the first undergraduate program in commercial space operations in the country and is under development at Embry-Riddle Aeronautical University to address the needs of expanding commercial and private space programs. From space flight operations and program management, to safety, regulation and training, the growth of commercial and civilian space flight programs will require educated, skilled personnel. Combined with the Space Coast workforce, ERAU's new education program will help integrate the extensive experience available in Florida's space program heritage with the commercial growth in local, regional, national, and international space projects.

The development phase of the degree program began in the summer of 2012 with an industry survey project that will be used for curriculum assessment and needs analysis. This research phase helped establish the curriculum structure that is aimed at a Bachelor's of Science degree with a focus on the new challenges of commercial and private space flight. Content of the proposed program will include space exploration, space science, space history, space policy and law, life support and space habitation, space physiology, space human factors, spacecraft systems, with likely emphasis on space flight safety and regulation.

***SMART Objective*** – On an annual basis, involve at least 100 students, representing a minimum of five Florida-based higher education institutions, including at least one minority serving institution, in collaborative space-based interactive learning experiences. *202 students from 9 universities, including 1 Hispanic serving institution and 1 HBCU, are participating in Higher Education Projects. Among the 202 students were 37 women and 72 under-represented minorities.*

## Research Infrastructure

Florida Space Research Program: In 2012, FSGC has funded 14 space research and education grants under the Florida Space Research Program (FSRP) totaling of \$540K (including matching of \$ 340 K) in funding to selected recipients. The FSRP combines both Federal and State funds for projects that diversify Florida's space industry and research efforts, while also supporting aerospace workforce development statewide. The program is comprised of three categories – The Space Education & Training Program, Space Exploration & Spaceport Technical Development, and Space-Based Research and Payload Development. The State of Florida and Space Florida have been significant contributors to the Florida Space Research Program for five years. The FSRP 2012 awardees include 7 Florida universities: the University of Florida, University of Central Florida, Florida Institute of Technology, Florida Atlantic University, University of South Florida, Florida State University, and Florida Gulf Coast University. A total of 29 proposals were received. Each submission was independently evaluated by a team of experienced professionals from Kennedy Space Center and other universities and NASA centers. In 2012, 15 students were directly funded through research grants. **4 students were under-represented minorities and 5 female students**

**SMART Objective** – *On an annual basis, at least 12 research projects will be competitively awarded. At least three of these research project awards will be awarded to a minority serving institution and/or include minority participation. At least 12 undergraduate or graduate students will be supported by the projects, including at least 5 women and 4 under-represented minorities*

14 awards were made to 7 universities involving 15 undergraduate and graduate students. **4 students were under-represented minorities and 5 female students.**

**Outcome 2:** *Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers, and faculty:*

### **Pre-college programs:**

**Eighth Annual Florida Engineering Education Conference:** The University of Central Florida's College of Engineering and Computer Science (CECS), will host the Eighth Annual Florida Engineering Education Conference (FEEC) on April 26, 2013 at the UCF's FAIRWINDS Alumni Center. The 2013 conference will remain a single day event with the agenda addressing "DoD engineering education". There will be a morning brunch and afternoon lunch with three panel presentations and three workshops in the afternoon. The panel presentations will include:

- Session One: DoD Engineering Education: An overview from the Services and Contractors regarding the importance of STEM to the Future Workforce
- Session Two: Integrating DoD science and engineering into the K12 classroom: An elementary, middle and high school perspective.



- Session Three: Informal DoD science and engineering programs offered by the Services, contractors and community organizations

The 2013 FEEC keynote speakers include the 2012-13 FES President, Angelina Fairchild and her co-presenter will be the Commanding Officer for the Navy Air Warfare Center in Orlando, Captain Steve Nakagawa. The 2013 conference partners include the Florida Engineering Foundation, Harris Corporation, the Florida Space Grant Consortium, Lockheed Martin, the Boeing Company, the Central Florida STEM Education Council and the Florida Department of Education. There were 170 registrants for this conference.

**Education Scholarship Program (ESP)** was be conducted by the Astronauts Memorial Foundation (AMF) in 2012-13. AMF created the curriculum and provide professional development training for Florida Educators. This professional development training dealt with STEM subject matter and focus on K-12 teachers and students. Full and/or partial scholarships were awarded to individuals, schools, and districts. A total of 80 educators from 12 Florida counties were able to take advantage of this opportunity. They represented the counties of Brevard, Duval, Manatee, Marion, Okeechobee, Osceola, Pasco, Pinellas, Putnam, Sarasota, Seminole, and Wakulla.

**Girls in Engineering, Math and Science (GEMS):** In its sixth year, Girls in Engineering, Math and Science (GEMS) was launched in 2006 to address our nation's shortage of women professionals in the fields of math, science and engineering. The GEMS program provides 6th, 7th, and 8th grade girls from public schools the opportunity to participate in STEM related activities on the Florida Gulf Coast University (FGCU) campus. GEMS provides creative hands-on science workshops for middle school female students from Lee and Collier counties. This year Jan DeJarnette and Jo Ann Wilson, from FGCU, were awarded a grant from NASA Florida Space Grant Consortium. With this funding, GEMS so far has served 93 middle school girls and 3 teachers in the workshop on February 9, 2013. Additional workshops are planned for May 1, 2013 and a couple others later in the summer. In addition, 10 FGCU undergraduates and 4 faculty played an active role in the success of GEMS in providing hands-on laboratory investigations for middle-school girls.

#### **Teach the Teacher, Stimulate the Student:**

This project provides three, one-hour professional development workshops for twelve middle school teachers, the development of curriculum and equipment kits for classroom instruction and an opportunity for the students to demonstrate their new knowledge and excitement for space exploration by conducting a simulated NASA space mission at the Challenger Learning Center (CLC). The workshops and kits are for the expressed purpose of increasing teachers' content knowledge regarding space exploration, physical and earth/space science and the purpose of the simulated NASA space mission is for students to actively participate and immerse themselves in simulated future NASA space missions. The goal of this program is to increase the content STEM knowledge of pedagogically strong teachers so that they can inspire their students to pursue higher education and careers in the STEM subject areas. The teachers come from Title 1 schools and the same teachers are attending the 3 workshops. The first workshop was held on October 6, 2012 and the theme was "Space Program: Past, Present, and Future". The second workshop was held on March 9<sup>th</sup> and the theme was "Physical Science Concepts related to the Space industry". The third workshop will be held

in the first Saturday in June after the FCAT's and the topic will be "Earth Science concepts related to the Space Industry"

**SMART Objective** – On an annual basis, conduct and/or facilitate space-related pre-service and in-service teacher training opportunities focused on space-related math and/or science curricula. A minimum of 50 Florida teachers per year will attend this training. *We will be supporting 92 teachers, after the completion of the final workshop in the summer. In addition, 170 teachers and administrators have registered for the Eighth Annual Florida Engineering Education Conference.*

**Outcome 3:** *Build strategic partnerships and linkages between STEM formal and informal education providers that promote STEM literacy and awareness of NASA's mission:*

**Orlando Science Center:** The Orlando Science Center (OSC) attracts nearly 300,000 visitors each year with dynamic and engaging content. The goal has always been to personalize the guest experience; demonstrating how science impacts everyday life. Structured programming ranges from on-site experiences that utilize exhibits, theatrical performances, classes, and events, to off-site educational programs in the schools. The Science Center's many collaborative partnerships with public school districts, universities, colleges, science/technology corporations and other commercial and professional enterprises aid in promoting science and technology education for students and in fostering science literacy among Florida's citizens.

After working closely with Orange County Public Schools (OCPS) to identify the appropriate grade level to focus our curriculum on, 3rd grade was identified as an ideal grade level. The following STEM-focused exhibit experiences are being implemented:

The Dino Dig Pit Experience- Students will step back into time to discover some of the Earth's greatest jewels... Fossils! This dig pit will house a number of fossils that students will examine, classify and measure to determine the mystery dinosaur's origin, life span, diet, etc. With respect to STEM, this offering addresses the mathematics associated with Paleontology.

STEM Offsite Offerings – Building on the STEM experiences from the previous year, a host of STEM offsite offerings will be designed and fabricated to ensure that we effectively support the 7 school districts OSC serves. Potential experiences are as follows, but not limited to:

- Rocket Launchers- Students design and construct rockets that must fly at a certain altitude along with a number of other criteria
- Portable Ball Wall-Engineering design challenge; Students create their own ramp design to get a ball from the top of the wall into a target cup. Visitors can also use challenge cards that include parameters that their design must incorporate to hit a specific target.

- Portable Wind Tubes- Creative design challenge; Students use various recycled materials to construct and test their own designs in the wind tubes. The materials change through use and provide open-ended opportunities for interaction and engagement.

Along with these experiences, OSC has also developed 60-minute Discovery Lab that focuses on their respective subject area and career pathway. This lab will discuss the various types of subject areas that support an interdisciplinary approach and highlight a number of careers associated with the design and build.

Most of these activities will be held during the summer and we will provide the final numbers after the completion of the activities.

## PROGRAM CONTRIBUTIONS TO NASA EDUCATION PERFORMANCE MEASURES

- **Student Data and Longitudinal Tracking:**

Student Data and Longitudinal Tracking: Total awards = 66; Fellowship/Scholarship = 37, Higher Education/Research Infrastructure = 29; 26 of the total award represent underrepresented minority F/S funding. During the FY12 program year 20 students are pursuing advanced degrees in STEM disciplines, 5 accepted STEM positions at NASA contractors, 2 accepted positions at NASA, 8 accepted STEM positions in industry, 8 accepted STEM positions in academia, and 13 went on to positions in non-STEM disciplines. The remaining students have not yet received the degree that they were pursuing while they received their Space Grant award.

- **Minority-Serving Institution Collaborations:**

We are partnering with Bethune Cookman University in partly sponsoring their scholarship program. In addition we have been encouraging faculty to apply to our research program. This year, so far, we have received 2 notices of intent from faculty at Bethune Cookman University

Early this year, FSGC Director and Assistant Director made a trip to Florida International University, specifically to talk to students about NASA FSGC and NASA opportunities. Initially the university had reserved a room for 20 students; however, we had to move to another room as there were over 50 student and science and engineering club presidents that wanted to be a part of this dialog. The students were informed of various space grant and NASA opportunities. One of the outcome of this meeting was the start of a rocketry club. FIU did not participate in any of the rocketry programs. To jump start their club, we conducted a workshop for interested students in the first week of March. 24 students, including 7 women and 17 under-represented minorities, participated in the workshop. They built and launched model rockets. The next step is for the students to participate in FSGC's Hybrid Rocket Competition and then NASA's USLI competition.

We are supporting a team from the FAMU-FSU College of Engineering that is participating in the RASC-AL Exploration ROBOOPS Competition hosted by NASA and the National Institute for Aerospace on June 4-6, 2013 . ROBO-OPS Project is a joint senior design project between Florida A & M University and Florida State University. Students majoring in Mechanical and Electrical Engineering are collaborating on a robot design project. In June 2013, NASA will be hosting the annual RASC-AL Exploration ROBO-OPS Competition. The goal of this project is to design and build an innovative robot to have accepted to enter in this competition

- **NASA Education Priorities:** *Accomplishments related to the “Current Areas of Emphasis” stated in the 2010 Space Grant solicitation. Report on areas that apply to work proposed in your proposal and budget.*

- Authentic, hands-on student experiences in science and engineering disciplines – the incorporation of active participation by students in hands-on learning or practice with experiences rooted in NASA-related, STEM-focused questions and issues; the incorporation of real-life problem-solving and needs as the context for activities.

*FSGC conducts a couple of programs involving hands-on student participation. One is the Hybrid Rocket Competition where students design and build hybrid rockets over 2 semesters and then launch their rockets in a competition at the end of the spring semester. 7 teams from 5 universities are participating in this year’s competition. The other design competition managed by FSGC is the Florida University nanosatellite design competition. Students from 2 universities are designing a cubesat with a final design to be selected in May. In addition, FSGC supports senior design projects in Florida universities and partly sponsors student teams to NASA competition like USLI, Lunabotics and zero G flights. FSGC is also partially supporting the team from Embry-Riddle that was selected to participate in this year’s Airforce Nano satellite Design Competition*

- Diversity of institutions, faculty, and student participants (gender, underrepresented, underserved).

*FSGC has been directly supporting 66 students from 10 institutions. Among the 66 students are 34 women and 36 under-represented minorities. 22 university faculty (6 women and 3 under-represented minorities) are involved in these projects involving students. In addition, 202 students from 9 universities, including 1 Hispanic serving institution and 1 HBCU, are participating in Higher Education Projects. Among the 202 students are 37 women and 72 under-represented minorities*

- Engage middle school teachers in hands-on curriculum enhancement capabilities through exposure to NASA scientific and technical expertise. Capabilities for teachers to provide authentic, hands-on middle school student experiences in science and engineering disciplines (see above).

*The Challenger Center in Tallahassee is conducting 3 professional development workshops for middle school teachers from Title 1 schools. The*

topics are “Space Program: Past, Present, and Future”, “Physical Science Concepts related to the Space industry”, and “Earth Science concepts related to the Space Industry”. 12 middle school teachers are participating in these workshops which include the development of curriculum and equipment kits for classroom instruction and an opportunity for the students to demonstrate their new knowledge and excitement for space exploration by conducting a simulated NASA space mission at the Challenger Learning Center (CLC).

- Summer opportunities for secondary students on college campuses with the objective of increased enrollment in STEM disciplines or interest in STEM careers.  
*Through the Girls in Engineering, Math and Science (GEMS) Program at Florida Gulf Coast University, 93 middle school female students from Lee and Collier counties, participated in one creative hands-on science workshop. Two more workshops are planned later in the summer.*
- Community Colleges – develop new relationships as well as sustain and strengthen existing institutional relationships with community colleges.  
*FSGC has been working closely with 3 community colleges, which has since become 4 year colleges. This seems to be the trend in Florida. We plan to hold hands-on space hardware workshops for selected students from a few of the remaining community colleges in Florida*
- Enhance the capacity of institutions to support innovative research infrastructure activities to enable early career faculty to focus their research toward NASA priorities.  
*FSGC has a research program called Florida Space Research Program whose main objective is to provide seed funding to faculty to conduct research in their institution so that they are able to use the results to get further funding from other sources. The projects have to be aligned with NASA’s priorities (included in the Request for Proposal). This program is co-sponsored by Space Florida (quasi state government entity). In FY2012, we supported 17 projects in 7 universities*

## IMPROVEMENTS MADE IN THE PAST YEAR

The major change in FSGC was moving our offices from the Astronaut Memorial Foundation at the Kennedy Space Center Visitor Complex to Research Park in Orlando, adjacent to the University of Florida campus. Buses transfer students from Research Park to the main campus. The reason was that our university was paying rent for the offices at the Visitor Complex and due to ongoing budget cuts at the state level, we could not justify paying rent for offices. We have also been evaluating our satellite design competition project and are working on making changes to the structure to make it exciting for students in universities with no aerospace departments.

## **PROGRAM PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION**

Listed below are all of FSGC's affiliates. Funds are not provided directly to affiliates for implementation of programs. FSGC awards are all competitive and awards are given to the respective PI's in their institution. The affiliate institution is responsible for sending final reports and all other relevant documentation to the FSGC offices. The only roles the affiliates have is to ensure that information from the FSGC office is being sent to all interested faculty and students and to ensure timely technical and financial reports to the FSGC office. In addition, the FSGC advisory Board, comprising of representatives from all 21 affiliates meet twice a year to approve the budget and FSGC programs.

**Bethune-Cookman University** (4-year college awarding exclusively baccalaureate degrees): Bethune-Cookman University is a historically Black, United Methodist Church-related college offering baccalaureate degrees.

**Broward College** (4-year college Bachelor of Science degrees in addition to their 2-year degree programs) Broward College is a Hispanic serving institute. Broward College offers Associate & Bachelor degrees & certificate programs at many locations in the Greater Fort Lauderdale /Broward County community. Specialized programs include online degrees, Health Sciences and Continuing Education.

**Embry-Riddle Aeronautical University** (University awarding baccalaureate and master's degrees): Embry-Riddle Aeronautical University, a private university, teaches the science, practice, and business of the world of aviation and aerospace.

**Eckerd College** (4-year college awarding exclusively baccalaureate degrees): Eckerd College is a private, coeducational college of liberal arts and sciences. Eckerd College is one of only 40 schools listed in Loren Pope's Colleges That Change Lives. In 2003, Eckerd was named one of 13 Institutions of Excellence in the First College Year by the Policy Center on the First Year of College. Eckerd College is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools to award the Bachelor of Arts and Bachelor of Science degrees.

**Florida Atlantic University** (University awarding degrees up through the Ph.D): Florida Atlantic University is the first public university in southeast Florida and the first in America designed for upper division students only. FAU is earning a reputation as a top research institution in areas ranging from biomedicine and biotechnology to ocean engineering and coastline security.

**Brevard Community College** (Community/Junior College awarding associate degrees): Situated on Florida's Space Coast, BCC has four integrated campuses – in Cocoa, Melbourne, Palm Bay and Titusville – an aerospace program at the Kennedy Space Center and a Virtual campus. An accredited institution, BCC is recognized as one of America's leading community colleges for quality in instruction, organization, and its innovative and leading-edge programs. It was one of the first community colleges in the country to offer the AA degree online.

**Florida Gulf Coast University** (4-year college awarding baccalaureate and graduate degrees): FGCU, a member of the State University System of Florida, is a comprehensive university created to address the educational needs of the rapidly growing Southwest Florida population. Florida Gulf Coast University is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools to award associate, baccalaureate, masters, and doctoral degrees. In addition, the university is actively seeking accreditation for the undergraduate engineering programs in the U.A. Whitaker School of Engineering, its Bachelor of Science in Social Work, its Bachelor of Science in Resort and Hospitality Management, and its Bachelor of Science in Clinical Laboratory Science.

**Florida Institute of Technology** (University awarding degrees up through the Ph.D): Florida Institute of Technology is an independent technological university that provides quality education, furthers knowledge through basic and applied research, and serves the diverse needs of our local, state, national and international constituencies. FIT is the only independent, technological university in the Southeast, A Barron's Guide "Best Buy" in College Education, listed among America's best colleges in U.S. News & World Report and named one of the nation's top 13 technological institutions in the Fiske Guide to Colleges.

**Florida International University** (University awarding baccalaureate and master's degrees, Hispanic Serving Institute): Florida International University is Miami-Dade County's first public, four-year university. FIU is ranked first in the nation among four-year colleges for awarding bachelor's and master's degrees to Hispanic students in the 2008 survey conducted by the Hispanic Outlook in Higher Education Magazine. FIU is the youngest university to have been awarded a chapter of Phi Beta Kappa, the nation's oldest and most distinguished academic honor society.

**Florida State University** (University awarding degrees up through the Ph.D): Florida State University's 16 colleges offer more than 300 undergraduate, graduate, doctoral, professional and specialist degree programs, including medicine and law, covering a vast array of disciplines critical to society today. FSU is a comprehensive, residential and coeducational institution of over 33,000 students located in Tallahassee, Florida.

**Florida A&M University** (University awarding degrees up through the Ph.D.; Historically Black College or University). Florida A&M University offers 108 undergraduate degrees in 64 undergraduate programs and 60 graduate degrees in 32 graduate programs (includes 1 professional and 7 doctoral degrees) within its 12 Schools and Colleges. The doctor of philosophy is offered in the College of Pharmacy and Pharmaceutical Sciences, College of Education and FAMU/FSU College of Engineering.

**University of Central Florida – Lead University:** (University awarding degrees up through the Ph.D). UCF has 12 colleges, including the newly established College of Medicine, and College of Graduate Studies. More than 50,000 students attend classes on UCF's main campus and its 11 regional campuses located throughout Central Florida. UCF offers 223 degree programs, it has become an academic and research leader in numerous

fields, such as optics, modeling and simulation, engineering and computer science, business administration, education, science, hospitality management and digital media

**University of Florida:** (University awarding degrees up through the Ph.D): The University of Florida is a major, public, comprehensive, land-grant research university. The state's oldest, largest and most comprehensive university, Florida is among the nation's most academically diverse public universities. With more than 51,000 students, Florida is now one of the five largest universities in the nation. It is one of only 17 public, land-grant universities that belongs to the Association of American Universities.

**University of Miami** (University awarding degrees up through the Ph.D): The University of Miami is the largest, most comprehensive private research university in the southeastern United States with a well-earned reputation for academic excellence. Nearly 15,000 undergraduate and graduate students from every state and more than 140 nations around the world call UM home during the academic semester. With more than 9,400 full- and part-time faculty and staff, UM is the second largest private employer in Miami-Dade County. The University's 12 colleges and schools, along with the Division of Continuing and International Education, offer 114 bachelor's, 104 master's, 57 doctoral and four professional areas of study.

**University of North Florida:** (University awarding baccalaureate and master's degrees): The University of North Florida is a comprehensive public urban university whose mission is to educate students through a broad array of undergraduate and select graduate programs. UNF cultivates a learning environment that supports intellectual curiosity, academic achievement, and personal growth. This goal is supported by a strong academic curriculum comprised of 56 undergraduate, 27 masters, and 3 doctoral degree programs in the liberal arts and professional fields.

**University of South Florida:** (University awarding degrees up through the Ph.D): The University of South Florida is the second largest university in the southeast and among the top 20 largest in the nation. It is one of the nation's top 63 public research universities and one of 39 community engaged public universities as designated by the Carnegie Foundation for the Advancement of Teaching. The University offers 219 degree programs at the undergraduate, graduate, specialist and doctoral levels, including the doctor of medicine.

**University of West Florida:** (University awarding baccalaureate and master's degrees): UWF is a member of the State University System of Florida. The university offers undergraduate degrees in 50 different areas with 107 specializations, master's degrees in 24 different areas with 56 specializations, two specialist degrees and a doctorate in education with seven specializations. Long celebrated for its caring, nurturing approach to helping

**Astronauts Memorial Foundation** (Private 501(c)(3) not-for-profit organization): The Astronauts Memorial Foundation honors and memorializes those astronauts who have sacrificed their lives for the nation and the space program by sponsoring the national Space Mirror Memorial, and by implementing innovative educational technology programs. AMF is a private, not-for-profit organization approved by NASA to build and maintain two major facilities at the John F. Kennedy Space Center's Visitor Complex.



**Kennedy Space Center** (Federal Center): KSC is the NASA center of excellence for launch and payload processing systems as well as the lead center for acquisition and management of expendable launch vehicle services and payload carriers. Located at the Cape Canaveral Spaceport in Florida, KSC handles the checkout, launch and landing of the Space Shuttle and its payloads.

**Orlando Science Center** (Science Museum): Orlando Science Center offers hands-on fun for all ages through engaging interactive exhibits, live programming, giant-screen films, school field trips and school-break camps. The science Center conducts the Informal Science program for FSGC

**Space Florida** (State/Local Government): Space Florida is the public-private partnership responsible for promoting and developing Florida's aerospace industry. Space Florida was created by the Florida Legislature to sustain Florida's position as the global space leader. As declared in its mission statement, Space Florida drives State economic development across the global aerospace enterprise. Space Florida provides \$125K for the FSGC research program and along with FSGC sponsors the undergraduate Academy program

<p><b>The National Space Grant Office requires two annual reports, this Annual Performance Data Report (APD) and the Office of Education Performance Measurement System (OEPM) report. The former is primarily narrative and the latter data intensive. Because the reporting timeline cycles are different, data in the two reports may not necessarily agree at the time of report submission. OEPM data are used for official reporting.</b></p>
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